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The Prairie Post Quarterly Newsletter of the High Plains Regional Climate Center- January 2020

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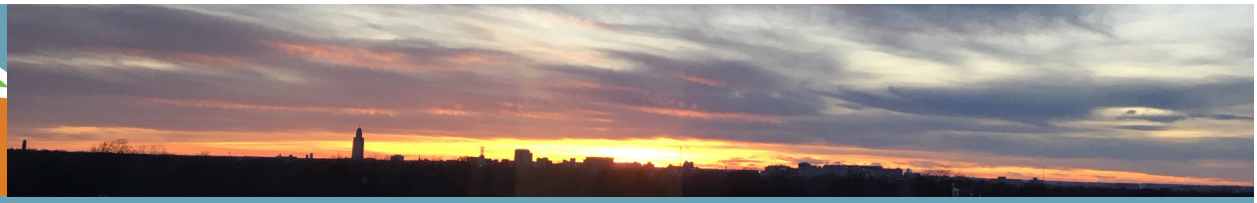

HPRCC

January 2020

The Prairie Post

Quarterly Newsletter of the High Plains Regional Climate Center

Inside this issue:

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December sunset from Hardin Hall at the University of Nebraska-Lincoln (photo courtesy Crystal Stiles)

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Message from the Director

By Dr. Rezaul Mahmood

Happy New Year! We hope you had a wonderful holiday season. As you will see in this issue of *The Prairie Post*, our staff have been quite busy over the last several months. In November, the HPRCC hosted State Climatologists from our region for a 1.5-day meeting to discuss our respective key activities, including recent stakeholder engagement and new tools and products that were introduced for improved climate-related decision-making. Please see Page 3 for more details. In early January, three HPRCC staff members and two graduate students presented on their work at the 100th Annual Meeting of the American Meteorological Society, held in Boston, MA. Read more about AMS and the great work our staff and graduate students are engaged in on Page 5. Our staff also met with and showcased our activities to several international visitors from the University of Dhaka, Bangladesh in October. Also this quarter, four of our staff members published a paper in the *Bulletin of the American Meteorological Society* on our Applied Climate Information System (ACIS) Climate Maps GIS Portal. Check out the portal here: https://hprcc.unl.edu/gis/. To see a snapshot of our staff's accomplishments in services and research in 2019, check out Page 2.

Looking ahead, we have an exciting quarter ahead of us! Our staff have been working together to upgrade the HPRCC website, and we expect to unveil our new website in the near future. The new website will offer an updated, sleek design, along with several new products to peruse. Our staff will also be interfacing with our tribal partners during the next quarter through meetings and workshops, one of which will be led by our staff on the Winnebago Reservation in Nebraska. Read more about our upcoming travel and activities on Page 6.

We expect another productive year here at the HPRCC, and we look forward to continued fruitful interactions with our partners. Thanks for reading *The Prairie Post*!

Meet Our New Arrival, Thomas Stiles

We have a new "junior climatologist" at the HPRCC – please welcome Thomas Gale Stiles, son of our Applied Climatologist Crystal Stiles and her husband Josh! Thomas made his debut on August 17, 2019, weighing 7 pounds 4 ounces and measuring 19 ½ inches long.

Thomas has already acquired copious amounts of weather-themed possessions, such as books about rain and onesies with clouds on them. While there is no guarantee that he will follow in his mom's footsteps and become a climatologist, we have no doubt that Thomas will grow up loving the weather!

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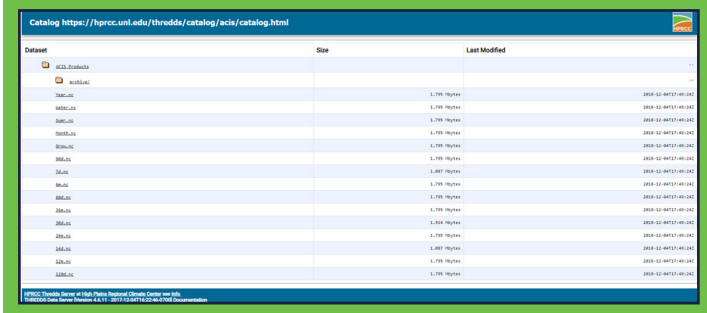
HPRCC in 2019 - Year in Review

We provided climate data and information:

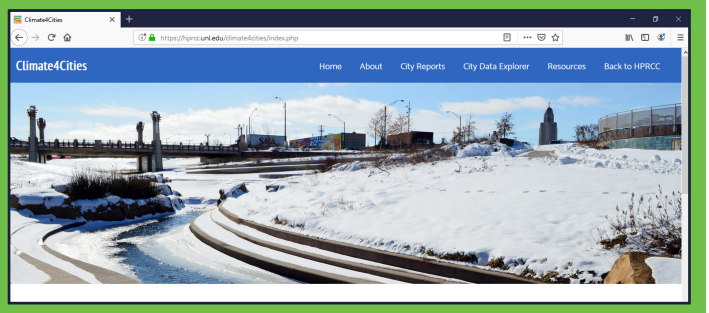
333 Climate Service Requests from **33** States and Washington D.C. and **4** Foreign Countries

We launched new products to meet regional needs:

HPRCC THREDDS Server



Climate4Cities Website



We engaged with our partners and stakeholders:

33 Presentations

5 Outreach Events

18 Technical Reports

9 Peer-reviewed Publications

4 Hands-on Workshops

1,285 Twitter Followers

HPRCC Hosts State Climatologists from Around the Region

Front row, left to right: Natalie Umphlett, Jamie Lahowetz, Becky Bolinger, Martha Shulski, Mary Knapp, Rezaul Mahmood.

Back row, left to right: Kelsey Jencso, Paul Flanagan, Warren Pettee, Russ Schumacher, Laura Edwards. (Photo by Shawna Richter-Ryerson)

In early November, the HPRCC was pleased to host a 1.5-day meeting with State Climatologists and staff from in and around the High Plains region. The meeting provided an opportunity for the group to share updates on recent activities, as well as needs for future collaborations on a regional level. General topics of discussion included the expansion of partnerships with tribal communities, the development of new crop and livestock monitoring tools, and the importance of needs assessments.

One topic that sparked a lot of discussion was the uptick in requests for information on extreme events and impacts, such as last year's spring flooding and ongoing wetness, recent drought, and temperature extremes. Of particular interest was how these events impact agriculture and livestock. The group identified several new areas of activities and potential development of new regional decision-support tools that could be introduced in the future. In particular, the HPRCC plans to provide a landing page on its website for information and resources on extreme events as they unfold. Stay tuned!

Local COOP Observers Win Jefferson and Holm Awards

Each day, thousands of citizen scientists report their local weather conditions through programs such as the Community Collaborative Rain, Hail, and Snow Network (CoCoRaHS) and the National Weather Service Cooperative Observer Program (COOP). These data are used extensively for both weather and climate applications, supporting decisions in a number of sectors, such as agriculture, water resources, and utilities. Thanks to these programs and dedicated observers, we can increase both the quality and quantity of weather and climate data.

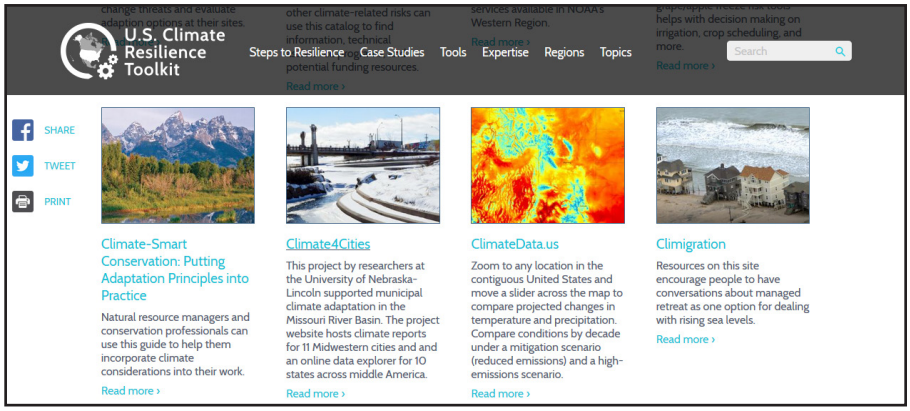
In recognition of the nation's most outstanding COOP observers, the National Weather Service presents several awards each year. The awards with the highest honor are named after two very notable observers: President Thomas Jefferson, the third president of the United States, and John Campanius Holm, the first known weather observer in colonial America. Only 5 Thomas Jefferson awards and 25 John Campanius Holm awards are given each year. Please join us in congratulating this year's recipients from the High Plains region!

Thomas Jefferson Award: Thomas M. Johnson of Osceola, NE; Jack Darnell of Jeffrey City, WY

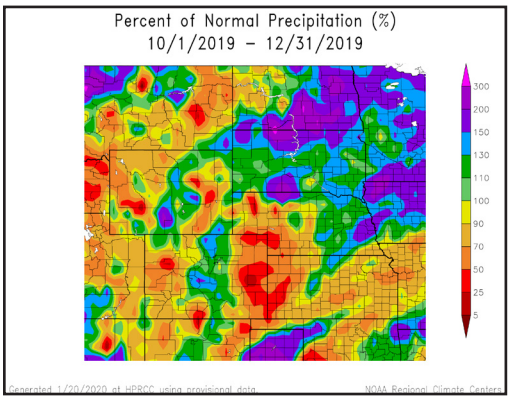
John Campanius Holm Award: Steven E. Aeilts of Casper, WY; Paul Holle of New Salem, ND; Richard A. Keen of Coal Creek Canyon, CO; Charles E. Taylor of Killdeer, ND; Bernard Vandorn of Frankfort, KS

Climate4Cities Now in Climate Resilience Toolkit

The Climate4Cities project is now featured in the U.S. Climate Resilience Toolkit, which is a resource that highlights online tools, case studies, and a framework for building resilience. Within the Toolkit, users can search over 200 tools that cover a number of sectors and regions. To visit the Climate4Cities page, please see: https://toolkit.climate.gov/tool/climate4cities. For more information about the U.S. Climate Resilience Toolkit, please see: https://toolkit.climate.gov/content/about.



Overview of Regional Climate Conditions



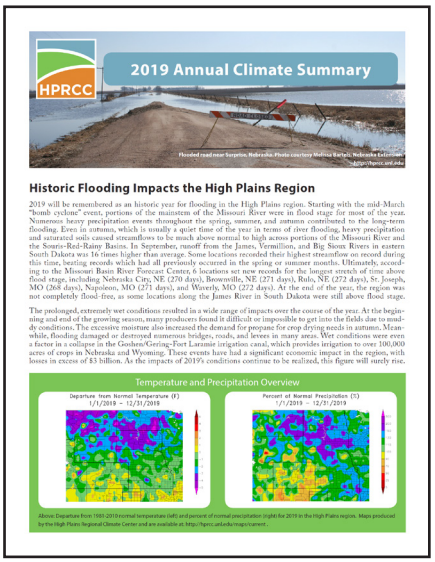
Continuation of Wet Conditions Rounds Out the Last Quarter of 2019

The last three months of the year were punctuated by extreme wetness, as several large storm systems impacted the High Plains region during this timeframe. This was particularly the case across northern areas of the region where precipitation totals were in excess of 200 percent of normal. These wet conditions caused significant delays for fall harvest activities, as many fields were muddy or completely inundated. Corn, soybeans, sugar beets, and sunflowers were hardest hit. In fact, the 2019 corn harvest was the slowest on record since 2009, with many fields unharvested at the time of this writing. The excessive wetness also led to a disaster declaration in North Dakota.

The active weather pattern during the October-December period allowed the snow season to get off to a strong start for parts of the region. The plentiful snowfall across portions of the Rocky Mountains allowed spotty areas of drought in northern and central Colorado to improve by the end of December; however, moderate to severe drought remained over western and southern Colorado. The abundant snowfall also gave ski resorts a chance to begin operating on time or even open a little early across central portions of Colorado. Across the Plains, snowfall was abundant in the October-December period as several large storm systems tracked across northern sections of the region during this time. For an example, see the information below in the annual climate summary highlights on the October blizzard that impacted the Dakotas. To learn more about the current state of the climate in the High Plains, check out our monthly, quarterly, and annual climate summaries here: https://hprcc.unl.edu/climatesummaries.php.

2019 Highlighted by Wetness, Flooding, and Other Extremes in the High Plains

In this year's annual climate summary, we take a look back at some of the major events and impacts that occurred during the past year. For more information, check out the full summary here: https://hprcc.unl.edu/climatesummary/Annual-2019.pdf.



Back-to-Back Wet Years: It was a wet year for much of the High Plains, with several locations in Kansas, Nebraska, North Dakota, and South Dakota having their wettest or near-wettest year on record. For some, this was a continuation of wet conditions. This prolonged wetness led to historic flooding and, ultimately, it was the 2nd highest runoff ever recorded in the Upper Missouri Basin, according to the U.S. Army Corps of Engineers.

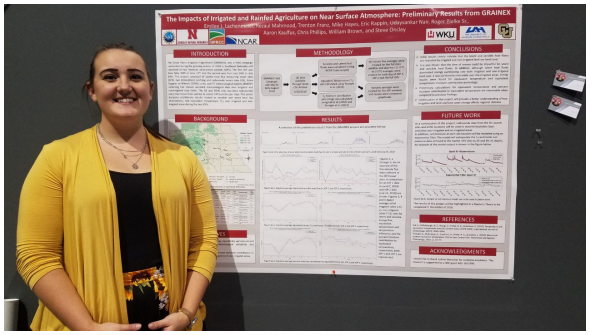
Historic Flooding in NE, IA, and SD: In mid-March, historic flooding occurred along the Platte and Missouri Rivers and their tributaries, which was due to a combination of frozen soils, ice jams, heavy rainfall, and rapid snowmelt. Preliminary estimates indicate that damage from the flooding exceeds $3 billion.

October Blizzard Impacts in ND and SD: A large storm system brought heavy rain, snow, and blizzard conditions to the Dakotas in mid-October. Due to the timing of the storm, there were numerous impacts, including widespread tree damage, power outages, flooding, and unharvested crops. In North Dakota, a statewide flood emergency was declared due to the flooding caused by rain and snowmelt.

Drought Development in CO and KS: Although much of the region was impacted by extremely wet conditions this year, drought conditions developed and expanded during the fall across southern Kansas and western and southern Colorado where precipitation deficits mounted. Dry conditions in Kansas have caused winter wheat emergence and development to lag.

Unfavorable Conditions for Growing Season: Cool, wet weather throughout the growing season created unfavorable conditions for planting, harvesting, and overall crop development this year. In the spring, planting and emergence were significantly delayed due to cool, wet conditions. Once planted, crops were slow to mature as these conditions continued into the summer. Although the fall started warm, harvest conditions were largely problematic, especially in northern areas where fields were either covered in snow, muddy, or completely inundated.

Center was Well-Represented at AMS 100th Meeting in Boston



HPRCC graduate student Emilee Lachenmeier presents her poster at AMS. (Photo by Emily Paltz)

The Annual Meeting of the American Meteorological Society, or AMS, is the world's largest yearly gathering for the weather, water, and climate community. This year was extra special, as it was the 100th meeting of the AMS, appropriately held in Boston, Massachusetts where the AMS Headquarters are located. The AMS Annual Meeting provides an opportunity to share research and network with fellow colleagues. This year, the HPRCC had quite a presence at the annual meeting, as three staff members and two graduate students attended and presented on their work. See below for a synopsis of the topics that were presented on:

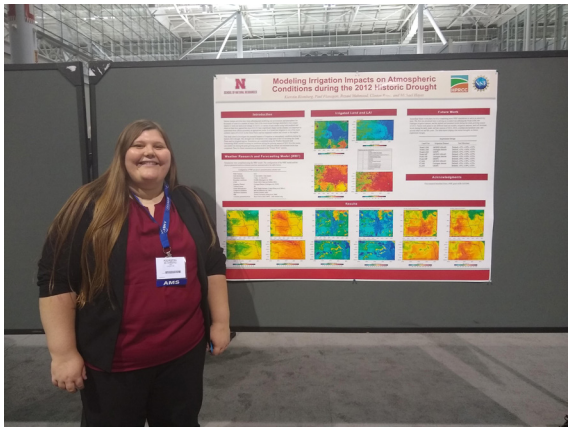
Crystal presented, "Building Indigenous Resilience to Drought through Regional Collaborations in the Missouri River Basin." This presentation was part of the session, *The Value of Federal Climate Services in Regional Contexts: Examples from Drought and the Future Landscape*. The presentation highlighted several collaborative projects between the HPRCC and its tribal and non-tribal partners that aim to increase the resilience of tribes to climate change and extreme events, as well as upcoming activities and funding opportunities that support this work. Crystal also volunteered at the Women in Atmospheric Sciences Luncheon, which celebrated the *Evolution of Women in AMS: "Past, Present, and Future."*

Natalie presented, "Climate4Cities: City Data Explorer Tools" during the tools café session, which highlighted new climate data tools and services. The poster and hands-on demonstration focused on four new tools that help users explore historic and future climate trends, as well as municipal climate adaptation planning strategies. See the tools here: https://hprcc.unl.edu/climate4cities/index.php. Also, as part of her duties as a member of the AMS Committee on Applied Climatology, Natalie co-chaired two sessions on *Climate Extremes of 2019: Impacts in the North Central Region.*

Paul presented, "A Hydrometeorological Assessment of the Historic 2019 Flood of Nebraska, Iowa, and South Dakota," a project that focused on the meteorological and hydrological conditions preceding the March 2019 cyclogenesis event and subsequent Missouri River Basin flood. He also presented two posters that focused on his work investigating 1) the atmospheric impacts of future land-use land-cover using the Weather Research and Forecasting (WRF) model, and 2) wet and dry years across the U.S. Great Plains within future climate model simulations.

Kierstin presented a poster titled, "Modeling Irrigation Impacts on Atmospheric Conditions during the 2012 Historic Drought." As the title suggests, this project modeled conditions during the 2012 growing season using the Weather Research and Forecasting (WRF) model, while incorporating irrigation data so as to study the impacts irrigation may have on atmospheric conditions.

Emilee presented a poster titled, "The Impacts of Irrigated and Rainfed Agriculture on Near Surface Atmosphere: Preliminary Results from GRAINEX." GRAINEX, or the Great Plains Irrigation Experiment, is a field project that was conducted during the growing season of 2018. The goal of the project was to collect near-surface and boundary layer variables to observe differences in irrigated vs. non-irrigated crop environments. Presentation highlights included a preliminary comparison of sensible and latent heat flux and future work prospects.



HPRCC graduate student Kierstin Blomberg presents her poster at AMS. (Photo by Emilee Lachenmeier)

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Want to learn more about AMS? Check out their website below:
https://www.ametsoc.org/index.cfm/ams/

Recent and Upcoming Travel and Activities

HPRCC staff and graduate students pose with the AMS 100 sign at the annual meeting in Boston, MA. From left to right: Kierstin Blomberg, Emilee Lachenmeier, Crystal Stiles, Natalie Umphlett, Paul Flanagan. (Photo by Dennis Todey)

Nebraska Climate/Drought Meeting, Lincoln, NE (October 31)
The Nebraska Climate/Drought Meeting brought together partners in order to discuss the continued coordination of input to the U.S. Drought Monitor. A number of people were in attendance, including representatives from the National Weather Service Offices that serve the state of Nebraska, as well as partners, such as the HPRCC, National Drought Mitigation Center, Nebraska State Climate Office, and UNL Extension.

Guest Lectures, Lincoln, NE (November 11 and 13)
This fall, Natalie had the opportunity to provide two guest lectures for classes within the School of Natural Resources. In these lectures, she spoke about climate services at the High Plains Regional Climate Center and how we transform data into information that can be useful for decisions.

SNR Seminar Series, Lincoln, NE (November 20)
In November, Natalie and Martha Shulski, the Nebraska State Climatologist, provided a presentation for UNL's School of Natural Resources Fall Seminar Series. Their talk, *Climate Change Planning and Cities: Lessons Learned from Partnerships on the Plains*, provided an overview of the recently-completed Climate4Cities project. To learn more about this project and its outcomes, please see: https://hprcc.unl.edu/climate4cities/index.php.

National Weather Service Partners Meetings, Kansas City/Pleasant Hill, MO (December 5-6)
In December, Natalie traveled to the Kansas City, MO area to meet with partners at the National Weather Service Central Region Headquarters, the Kansas City/Pleasant Hill Weather Forecast Office, and the Missouri Basin River Forecast Center. The meetings provided an opportunity to share updates and discuss future collaborations.

Upcoming: Northeast Oklahoma Tribal Resilience Workshop, Quapaw, OK (February)
Hosted by the Quapaw Nation and the Institute for Tribal Environmental Professionals (ITEP), this workshop aims to help tribal leaders, program coordinators, planners, and managers develop the skills necessary to address extreme events and harmful environmental trends. Crystal was invited to present on the topic of drought in northeast Oklahoma.

Upcoming: Climate Summary and Tools Workshop, Winnebago, NE (March)
As part of a Bureau of Indian Affairs-funded project, Natalie and Crystal will be traveling to the Winnebago Reservation to deliver a workshop on climate summaries and tools. This workshop will be attended by tribal resource managers from the nine tribes in EPA Region 7, located in Kansas, Nebraska, and Iowa.

Upcoming: Great Plains and Rocky Mountain Tribes Agriculture & Range Trust Land Management Meeting, Rapid City, SD (March/April)
This meeting will be hosted by the Rosebud Sioux Tribe, the Northern Cheyenne Tribe, and the Bureau of Indian Affairs. Intended for producers and natural resource managers, the meeting will provide information and updates on buffalo management, USDA programs, and climate and drought tools. The agenda is still tentative, but HPRCC staff plan to attend.

Natalie (center) poses with Bethany Perry, NOAA Central Region Collaboration Team Coordinator (left) and Wendy Pearson, Hydrologist-in-Charge at the Missouri Basin River Forecast Center (right) at the National Weather Service Office in Pleasant Hill, MO. (Photo by Spencer Mell)

Upcoming: NOAA Central Region Collaboration Team Meeting, La Jolla, CA (April)
The annual meeting of the NOAA Central Region Collaboration Team will be held in La Jolla, CA in April. Natalie will be attending and looks forward to exploring opportunities for new collaborations in the region.